



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/506,914

05/23/2005

Neil Maxted

30698/CDT413

5420

4743

7590

06/10/2009

MARSHALL, GERSTEIN & BORUN LLP  
233 SOUTH WACKER DRIVE  
6300 SEARS TOWER  
CHICAGO, IL 60606-6357

EXAMINER

YAMNITZKY, MARIE ROSE

ART UNIT

PAPER NUMBER

1794

MAIL DATE

DELIVERY MODE

06/10/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/506,914	<b>Applicant(s)</b> MAXTED ET AL.	
	<b>Examiner</b> Marie R. Yamnitzky	<b>Art Unit</b> 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 February 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8, 11, 13, 14, 17-24, 26-32 and 34-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8, 11, 13, 14, 17-24, 26-32 and 34-40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

Art Unit: 1794

1. This Office action is in response to applicant's amendment filed February 26, 2009, which amends claim 1.

Claims 1-8, 11, 13, 14, 17-24, 26-32 and 34-40 are pending.

2. The examiner has reconsidered the rejections under 35 U.S.C. 103(a) based on Funhoff et al. (US 5,518,824) in view of one or more secondary references as set forth in the Office action mailed August 26, 2008, and withdraws the rejections.

3. The disclosure is objected to because of the following informalities:

On June 05, 2008, applicant filed an amendment that included an amendment to the paragraph bridging pages 8 and 9 of the specification. The amended paragraph is missing text in lines 2-4.

Appropriate correction is required.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 19-21, 23, 24 and 35 are rejected under 35 U.S.C. 102(e) as being anticipated by Taguchi (US 2002/0041979 A1).

Taguchi's light emitting device of Comparative Example 12 has a light emitting layer comprising polymer P-5 and Ir(ppy)<sub>3</sub>. Ir(ppy)<sub>3</sub> is a phosphorescent material. Polymer P-5 is a polymer that could be obtained from a polymerizable compound as defined in claim 1. The light emitting layer of this device meets the limitations of a film per present claims 19-21 and 35, and the device meets the limitations of a device per present claims 23 and 24. Although the light emitting layer of this device is made from a composition comprising a polymer and a phosphorescent material, rather than a polymerizable compound and a phosphorescent material, polymer P-5 could be obtained from a polymerizable compound as defined in claim 1, and therefore the claimed film and device, which comprises the polymer resulting from polymerization of the polymerizable compound as defined in claim 1, is met by the prior art.

The examiner reads no limitations into the "predetermined pattern" language of claims 21 and 35 (e.g. the examiner does not interpret this as being limited to a discontinuous coating).

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-5, 13, 14, 17-21, 23, 24, 26-29, 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi et al. (US 7,396,598 B2).

Takeuchi et al. disclose light-emitting polymers made from a polymerizable phosphorescent material. The polymers may be copolymers made from compositions comprising a mixture of a polymerizable phosphorescent material and a polymerizable charge transporting material. Takeuchi et al. provide specific examples of copolymers made from a mixture of phosphorescent material and charge transporting material, but these specific examples differ from a polymer that would be obtained from a composition according to the present claims in that the polymerizable charge transporting compound has only one group capable of undergoing polymerization (i.e. is a compound of the formula set forth in present claim 1 wherein n is 1, whereas claim 1, with all claims dependent directly or indirectly therefrom, limits n to 2 or more). See Examples 79-81 (columns 191-192), which disclose polymerizable compositions comprising N-vinylcarbazole, which is a polymerizable compound having an organic charge transporting fragment that comprises carbazole (corresponding to present Q), and one vinyl group (corresponding to present X), and a phosphorescent material which is a phosphorescent organometallic complex of iridium. The phosphorescent material is present in the composition in an amount of about 10 molar% based on the combined amount of phosphorescent material and polymerizable hole transporting compound. The polymerizable compositions of Examples 79-81 further comprise an initiator. The polymerizable compositions of Examples 79-81 meet the limitations of present claims 1-5, 13, 14 and 17, with the exception of the definition of “n”.

Takeuchi et al. disclose cross-linked polymers obtained by utilizing a polymerizable phosphorescent material having two or more polymerizable groups. See c. 49, l. 1-c. 51, l. 18 and c. 59, l. 44-51 for additional disclosure of phosphorescent materials having two polymerizable groups. Takeuchi et al. teach that the polymers may be copolymers obtained by copolymerizable the phosphorescent material with a polymerizable hole transporting compound or polymerizable electron transporting compound (e.g. see c. 59, l. 53-c. 60, l. 3). It would have been an obvious modification to one of ordinary skill in the art at the time of the invention to utilize polymerizable charge (hole or electron) transporting compounds having more than one polymerizable group.

With respect to present claim 18, the compositions of Examples 79-81 comprise an initiator, but an initiator is not required. It would have been an obvious modification to make similar compositions utilizing polymerizable charge transporting compounds having two or more polymerizable groups, with or without a separate initiator.

With respect to present claims 19-21, 23, 24 and 35, the devices of Examples 82-84, in which the light emitting layer is made from the compositions of Examples 79-81, respectively, meet the limitations of these claims with the exception that the compositions of Examples 79-81 do not meet the definition of “n” in claim 1. It would have been an obvious modification to one of ordinary skill in the art at the time of the invention to utilize polymerizable charge (hole or electron) transporting compounds having more than one polymerizable group to make compositions similar to Examples 79-81, and to use such compositions to make devices similar to those of Examples 82-84.

With respect to claim 26, Takeuchi et al. teach that a separate electron transport layer may be included in the device structure between the light emitting layer and the cathode (e.g. see Fig. 1 and c. 55, l. 31-37).

With respect to claim 27, Takeuchi et al. teach that the device may be a matrix device. As known in the art, a matrix may be a passive matrix or an active matrix. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide active-matrix addressing means for devices intended to be used as an active matrix device.

With respect to claims 28 and 29, Takeuchi's Examples 82-84 form a film of the polymerized composition, rather than applying the polymerizable composition and then polymerizing, but Takeuchi teaches that a film may also be formed by applying the polymerizable composition and then polymerizing (e.g. see c. 87, l. 37-45).

With respect to claim 34, it would have been an obvious modification to one of ordinary skill in the art at the time of the invention to utilize polymerizable charge (hole or electron) transporting compounds having more than one polymerizable group to make composition similar to Examples 79-81, and it would have been within the level of ordinary skill of a worker in the art at the time of the invention to determine suitable relative amounts of phosphorescent material to be included in the polymerizable composition. The compositions of Examples 79-81 comprise about 10 molar% of phosphorescent material, but Takeuchi's disclosure is not limited to this amount.

The portions of Takeuchi's disclosure that are relied upon in making this rejection find support at least in Takeuchi's U.S. priority provisional App. No. 60/337,157. (A certified translation of 60/337,157 is of record in Takeuchi's App. No. 10/481,442.)

8. Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi et al. (US 7,396,598 B2) as applied to claims 1-5, 13, 14, 17-21, 23, 24, 26-29, 34 and 35 above, and further in view of Kikuchi et al. (US 6,416,915).

Takeuchi et al. teach that polymerizable charge transporting materials may be copolymerized with a polymerizable phosphorescent material. While the portions of Takeuchi's disclosure that have an effective U.S. filing date prior to present applicant's foreign priority date do not explicitly disclose a polymerizable charge transporting material having at least two polymerizable groups, it is the examiner's position that use of a polymerizable charge transporting material having at least two polymerizable groups would have been an obvious modification to one of ordinary skill in the art given Takeuchi's disclosure that does have an earlier effective U.S. filing date. Further with respect to the charge transporting fragment as defined by present claims 6-8, these claims encompass charge transporting fragments obtained from hole transporting compounds that were known in the art at the time of the invention. For example, the limitations of claims 5-8 are met by a derivative of CBP in which at least two polymerizable groups are attached to CBP. The limitations of claims 5 and 6 are also met by derivatizing other known hole transporting compounds such as TPD,  $\alpha$ -NPD and MTDATA (see c. 60, l. 39-42) to include at least two polymerizable groups.



Takeuchi et al. do not disclose specific examples of polymerizable hole transporting materials according to present claims 5-8, but polymerizable hole transporting materials within the scope of these claims were known at the time of the invention as demonstrated by the patent to Kikuchi et al. It would have been an obvious modification to one of ordinary skill in the art at the time of the invention to incorporate polymerizable hole transporting materials such as disclosed by Kikuchi et al. into Takeuchi's polymerizable compositions to form polymers comprising hole transporting units derived from hole transporting compounds known to be useful in the art at the time of the invention.

9. Claims 5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi et al. (US 7,396,598 B2) as applied to claims 1-5, 13, 14, 17-21, 23, 24, 26-29, 34 and 35 above, and further in view of Funhoff et al. (US 5,518,824).

Takeuchi et al. teach that polymerizable charge transporting materials may be copolymerized with a polymerizable phosphorescent material. While the portions of Takeuchi's disclosure that have an effective U.S. filing date prior to present applicant's foreign priority date do not explicitly disclose a polymerizable charge transporting material having at least two polymerizable groups, it is the examiner's position that use of a polymerizable charge transporting material having at least two polymerizable groups would have been an obvious modification to one of ordinary skill in the art given Takeuchi's disclosure that does have an earlier effective U.S. filing date. Further with respect to the charge transporting fragment as defined by present claims 5 and 11, claim 5 encompasses charge transporting fragments obtained

Art Unit: 1794

from hole transporting compounds that were known in the art at the time of the invention and claim 11 encompasses charge transporting fragments obtained from electron transporting compounds that were known in the art at the time of the invention.

Takeuchi et al. do not disclose specific examples of polymerizable hole transporting materials according to present claim 5 or specific examples of polymerizable electron transporting materials according to present claim 11, but polymerizable materials within the scope of these claims were known at the time of the invention as demonstrated by the patent to Funhoff et al. It would have been an obvious modification to one of ordinary skill in the art at the time of the invention to incorporate polymerizable hole or electron transporting materials such as disclosed by Funhoff et al. into Takeuchi's polymerizable compositions to form polymers comprising charge transporting units derived from charge transporting compounds known to be useful in the art at the time of the invention.

10. Claims 22, 30-32 and 36-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi et al. (US 7,396,598 B2) as applied to claims 1-5, 13, 14, 17-21, 23, 24, 26-29, 34 and 35 above, and further in view of Okunaka et al. (US 6,696,181 B2).

Takeuchi et al. disclose polymerizable compositions that can be polymerized by exposure to heat or actinic radiation. While the portions of Takeuchi's disclosure that have an effective U.S. filing date prior to present applicant's foreign priority date do not explicitly disclose a polymerizable charge transporting material having at least two polymerizable groups, it is the examiner's position that use of a polymerizable charge transporting material having at least two

polymerizable groups would have been an obvious modification to one of ordinary skill in the art given Takeuchi's disclosure that does have an earlier effective U.S. filing date.

Takeuchi et al. teach that the polymerizable compositions may be used to make organic light-emitting devices such as flat panel displays. Takeuchi et al. do not explicitly disclose devices having at least two layers made from the polymerizable compositions as per present claims 22 and 36-40, or the method steps of present claims 30-32, but it was known in the art at the time of the invention that multi-colored light-emitting displays could be made by using polymerizable compositions in a manner similar to that of the present claims as demonstrated by the Okunaka et al. reference. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize compositions of Takeuchi et al. to make multi-colored light-emitting displays according to known methods such as those disclosed Okunaka et al. It would have been within the level of ordinary skill of a worker in the art at the time of the invention to provide polymerizable compounds having polymerizable groups suitable for use in specific known methods of forming multi-colored displays, and to adapt known methods of forming multi-colored displays in order to make displays using Takeuchi's compositions.

11. Applicant's arguments filed February 26, 2009 have been fully considered to the extent that they are applicable to the rejections as set forth in this action, but they are not persuasive.

The rejection based on the Taguchi reference is new. The rejections based on the Takeuchi et al. reference have been modified.

The present examiner is of the position that the pending claims are obvious over the previously applied prior art of Takeuchi (alone or in view of a secondary reference as set forth in this action), but for different reasons than stated by the prior examiner. The rejections based on Takeuchi as set forth in this action also take into consideration the disclosure of applicant's foreign priority application and the disclosure of Takeuchi's U.S. priority provisional applications in determining portions of the Takeuchi reference that constitute prior art. With respect to applicant's argument that Takeuchi discloses light-emitting complexes which include a polymerizable substituent or ligand such that the resultant polymer contains the light-emitting complex and "not a mixture of two separate components, as claimed", the examiner notes that the present claim language does not restrict the phosphorescent material from including a polymerizable substituent or ligand. The present claim language encompasses the polymerizable phosphorescent metal complexes of Takeuchi, and products made therefrom.

With respect to Takeuchi's teachings in the paragraph bridging columns 85 and 86 regarding crosslinking polymerizable electron transporting compounds, the compounds named at column 86, lines 12-13, meet the limitations of the polymerizable compound (A) as defined in claim 1, and meet the further limitations of at least claim 11. Example 20 (col. 115) is a copolymer made from a phosphorescent material and a polymerizable compound (A) as defined in present claims 1-4 and 11. However, given the disclosure of present applicant's foreign priority application (which is of record, and is in English), and given the disclosure of Takeuchi's U.S. priority provisional applications, the disclosures at c. 86, l. 11-13, and Example 20 do not constitute prior art. Certified translations of Takeuchi's U.S. provisional applications

Art Unit: 1794

are of record in Takeuchi's non-provisional App. No. 10/481,442. None of Takeuchi's U.S. provisional applications appears to explicitly disclose the text at c. 86, l. 11-13 of the patent, or Example 20.

12. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 7:00 a.m. to 3:30 p.m. Monday and Wednesday-Friday.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

/Marie R. Yamnitzky/  
Primary Examiner, Art Unit 1794

MRY  
June 08, 2009